AMENDMENTS TO THE CLAIMS

1. *(Currently amended)* Long Elements Method (LEM) for real time physically based modeling of a deformable medium, comprising the steps of:

constructing a plurality of long elements in a computer;

configuring said computer with a meshing strategy based on said plurality of long elements wherein number of said plurality of long elements is proportional to b^2 where b is length of a side of said deformable medium thereby substantially reducing number of time steps required by said modeling; and

using the results of said configuring ~~to model~~ for modeling soft tissue simulation, surgical simulation, unrestricted multi-modal interactive simulation including simulating interactive topological changes, volumetric modeling for homogeneous or non-homogeneous materials, or graphic or haptic rendering.

2. *(Original)* The method of claim 1, wherein said deformable medium represents soft tissue.

3. *(Original)* The method of claim 1, wherein said deformable medium is an object filled with fluid.

4. *(Cancelled)*

5. *(Currently amended)* The method of claim 1, further comprising a step of:

~~providing means for~~ simulating deformations and dynamics of said deformable medium.

6. *(Original)* The method of claim 5, wherein said deformations include elastic and plastic deformations and said dynamics include movement of said deformable medium.

7. *(Currently amended)* The method of claim 1, further comprising a step of:

~~providing means for~~ simulating elastic deformations of said deformable medium, wherein said deformable medium is an object filled with fluid.

8. *(Original)* The method of claim 7, wherein said means for simulating is based on a set of static equations, volume conservation, and Pascal principle $\Delta P_i = \Delta P_j$ where P is pressure for any i and j.

9. *(Original)* The method of claim 8, wherein each of said static equations is an equilibrium equation defined for each of said plurality of long elements using material properties comprising pressure, volume, stress, strain, position, and velocity.

10. *(Currently amended)* Long Elements Method (LEM) for real time physically based simulation of a deformable object, comprising the steps of:

discretising volume of said deformable object with a plurality of long elements wherein number of said plurality of long elements is proportional to b^2 where b is length of a side of said deformable object;

providing a set of static equations wherein each of said static equations is defined for each of said plurality of long elements using dynamic variables;

providing a static stateless deformation engine for simulating globally and physically consistent elastic deformations of said deformable object; and

using said set of static equations and said static stateless deformation engine ~~to simulate said deformable object~~ for soft tissue simulation, surgical simulation, unrestricted multi-modal interactive simulation including simulating interactive topological changes, volumetric modeling for homogeneous or non-homogeneous materials, or graphic or haptic rendering.

11. *(Original)* The method of claim 10, wherein said deformation engine is based on said set of static equations, volume conservation, and Pascal principle.

12. *(Previously presented)* The method of claim 10, wherein said dynamic variables represent quantities that vary significantly during said simulation, said dynamic variables comprising pressure, volume, stress, strain, position, and velocity.

13. 20. (*Cancelled*)

21. *(Currently amended)* Long Elements Method (LEM) for real time physically based dynamic simulation of a deformable medium, comprising the steps of:

generating a plurality of long elements wherein each of said plurality of long elements is an one-dimension entity;

meshing said deformable medium based on said plurality of long elements wherein number of said plurality of long elements is proportional to b^2 where b is length of a side of said deformable medium; ~~and~~

simulating said deformable medium in at least two different dimensional spaces simultaneously, wherein said at least two different dimensional spaces comprising lower order dimensions and higher order dimensions; and

utilizing said simulating for soft tissue simulation, surgical simulation, unrestricted multi-modal interactive simulation including simulating interactive topological changes, volumetric modeling for homogeneous or non-homogeneous materials, or graphic or haptic rendering.

22. *(Previously presented)* The method of claim 21, wherein said meshing step further comprises the steps of:

projecting said deformable medium into a plurality of representations in lower order dimensions; and

crossing said deformable medium with a plurality of reference planes of lower order dimensions, wherein points inside said deformable medium are simulated with respect to relative positions on said reference planes.

23. *(Previously presented)* The method of claim 21, wherein said plurality of long elements comprise straight long elements and free form long elements.

24. *(Previously presented)* The method of claim 21, wherein said at least two different dimensional spaces comprise a one-dimension long element space and a three-dimension Cartesian space.

25. 35. (*Cancelled*)